described in connection with the embodiment of FIGS. 1–9.

In the embodiment of FIG. 10, the tubular material is multilayered, having an inner inert layer 257 with other layers added to it for the purpose of protection an sealing and in some cases printing. For example, the inner layer 257 may be polytetrafluoroethylene such as that sold by E. I. DuPont Corporation, Wilmington, Del., under the trademark, Teflon, an adjacent sealing or backing layer 259 may be of polyethylene, a layer 261 may be added for outer abrassion resistance, such as a layer of mylar and a still further layer such as indicated at 260 may be added to receive the printed indicia applied by the printer 160. In some embodiments, the bag may be evacuated of air after receiving a liquid sample by applying suction to the discharge tube 252 prior to sealing.

In FIG. 11, there is shown a sectional view taken through lines 11—11 showing the discharge tube 252 extending through a plastic eliptical or oblong-shaped mandrel 250 which receives the webbing material 254 and is adapted to have pins 262 of the tractor mechanism 256 (FIG. 10) engage therewith. The mandrel 250 in the preferred embodiment is oblong or eliptical in cross-section as to maintain the web material 254 relatively flat with the perforated edges extending in line with the major axis of the elipse formed by the mandrel 250 and to provide a relatively flat printing surface.

In FIG. 12, there is shown still another embodiment 22B of web processing system having the web roll 76, printing mechanism 160, discharge tube assembly 256A compartment 27A for sample packages such as 24A, 24B, 24C, a fill platform 270 and a web control roller assembly 272. The fill platform is angled and located under the dischage tube assembly 256A and the printing assembly 160 is above the web control roller assembly that controls the motion of the web under the control of the microprocessor and holds the web flat for printing.

In this embodiment, the web material is preformed as a plurality of attached bags in a manner known in the art and wound around the web roll 76. It may be pulled downwardly in a manner similar to the embodiments of FIG. 1 or gravity may be relied upon to pull it downwardly under the control of the web control roller assembly which holds the web between rollers and releases it by rotation of the rollers. The sample bags are pulled over the filling platform 270 by gravity and by the web control roller assembly 272 which also pulls the webbing material past the printing mechanism 160 for imprinting thereon.

The discharge tube assembly 256A includes a stinger on the bottom adapted to engage a septum in the sample bags, and a drive pinion and rack assembly 277 controlled in position by a LVDT (linear variable-differential transformer). The dischage tube assembly 256A extends downwardly so that its stinger moves into a septum in the bag but is short of the bottom layer of the bag. The stinger enters the septum and frictionally grasps it when it is in its lowest position.

After the stinger enters the septum, the discharge tube and stinger pulls upwardly to lift the septum and upper wall of the bag a short distance. The pumping mechanism then pumps liquid into the bag and fills it with the programmed amount of sample. Bags already filled, such as 24A, 24B and the like, when released by the rollers of the roller assembly 272 to permit forward movement, pull the bags downwardly after they are filled.

When filled to the programmed extent, the stinger is withdrawn and the septum is snaps closed, after which, the program controlled roller mechanism 272 permits another bag to roll into position under the discharge tube assembly 256A.

In FIG. 13, there is shown an enlarged, fragmentary view, partly broken away of the discharge tube assembly 256A and the septum 274 forming a portion of the bags, such as 24A, prior to the time they are filled. As shown in this view, the discharge tube assembly 256A includes an outer tubular sheath 276 large enough to rest on the outer wall of the septum 274 and receiving in its interior a tappered inner discharge needle 252A having a pointed end at 273 and a dischage port 275. The discharge needle 252A is aligned to pierce the inner membrane 283 of the septum 274 at 281 so that the port 275 extends below the membrane 283 to inject liquid therein.

The membrane 283 grips the needle 252A frictionally with the bottom of the outer sheath 276 resting on the top edge 280 of the septum. Because of the frictional grip of the septum, the entire outer sheath 276 and needle 273 are slightly raised before liquid flows into the bag to lift the top member 277 of the bag 24A from the bottom member 279 to permit the flow of liquid.

The fluid is discharged between the two layers of the bag while it rests on the roller platform 270. After the bag is filled, the inner discharge needle 273 is pulled upwardly, releasing the frictional grip on the septum and permitting the septum to close into a liquid tight seal in a manner known in the art. Since the frictional grip has been released, the bag such as 24A (FIG. 12) is now free to move when released by the roller mechanism 272 (FIG. 12) under its own weight. The entire discharge tube assembly may be pulled slightly updwardly at the time or before the release of the bags by the mechanism 272 to permit the bag, without interference, to be pulled downwardly by the weight of previous bags and by its own weight on the platform 270.

The discharge needle 273 should be made of an inert material such as stainless steel and have a diameter of at least 0.125 of an inch to permit sufficient flow of liquid into the bagging material. The septum 274 will be of corresponding size such as at least 0.375 of an inch.

In FIG. 14, there is shown another embodiment of web processing system 22C having a discharge tube assembly 290 and a preformed flexible bag assembly 292. The preformed bag assembly 292 supports a plurality of preformed bags such as 24A, 24B and the like, each of which has a corresponding septum 274A, 274B and the like, movably on a holder assembly 294 with their corresponding septa extending upwardly in a first direction facing the discharge tube assembly 290.

The discharge tube assembly 290 grasps the preformed bags, one by one, and moves them one by one sequentially along the holder assembly 294 into a first position in which indicia may be imprinted upon them and then to a second position in which they may be filled, prior to being dropped into a container.

The preformed bag assembly 292 includes a bag support system 294, the printing assembly 160 and a support plateform 296. The bag support system 294 includes parallel pairs of rails, with each rail passing through a corresponding one of two eyelets on each of the bags 24A–24G. The bags 24A–24G each have a corresponding one of the septums 274A–274G extending upwardly beyond the support system 294 for engagement with the dischage tube assembly 290.